# Summary of Changes

ENERGY STAR® for Computer Monitors
Draft 2 Version 4.0 Specification

Since early in 2002, EPA has been developing, with significant input from industry stakeholders, a new Version 4.0 Specification for computer monitors that addresses power consumption in three modes: On, Sleep, and Off. Draft 2 embodies many of industry's comments on the energy-efficiency specifications in Draft 1 as well as incorporates the new test methodology used by EPA and manufacturers in two recent rounds of voluntary testing.

While notes and clarifications are found throughout the Draft 2 Version 4.0 Specification, this summary highlights the major changes made to the Draft 1 format and performance requirements. For additional details and documentation, please visit the Monitors section of the ENERGY STAR Product Development Web site at www.energystar.gov/productdevelopment.

The changes and clarifications described below are reflected in the Draft 2 ENERGY STAR Eligibility Criteria and are presented with their corresponding section numbers for easy reference.

## 1) Definitions

Line edits, designed to clarify the terms while not substantively changing them, have been made to the following definitions in Section 1:

B. On Mode/Active Power

This operational mode definition, as well as others below, has been reordered to proceed from highest to lowest power consumption.

C. Sleep Mode/Low Power

Three minor changes have been made to this definition: 1) The phrase "request from a user" has been expanded to include "computer," given that the monitor is technically controlled by the computer; 2) For clarity, a few examples of a "request from a user/computer" have been inserted into the definition; and 3) The definition has been reordered so that all three operational modes are presented from highest to lowest power consumption.

D. Off Mode/Standby Power

Two minor changes have been made to this definition: 1) The phrase "request from a user" has been expanded to include "computer," given that the monitor is technically controlled by the computer; 2) The definition has been reordered so that all three operational modes are presented from highest to lowest power consumption.

## 3) Energy-Efficiency Specifications for Qualifying Products

Section 3 has been significantly revised to include a two-tiered specification for On, Sleep, and Off Modes.

A. On Mode/Active Power

In Draft 2, the On Mode/Active Power levels are presented in two tiers. For Tier 1, the following equation applies: Y = 30 + 33X. Y is expressed in watts and rounded up to the nearest whole number and X is the number of megapixels in decimal form (e.g., 1,920,000 pixels = 1.92 megapixels). Tier 1 levels are based on test data submitted to EPA by monitor manufacturers and represent the top 17% of CRTs and 90% of LCDs from this data set for *all three modes*.

For Tier 2, a new equation is provided: If X < 1 megapixel, then Y = 20; if X > 1 megapixel, then Y = -5 + 26X. In other words, monitors with less than 1 million pixels may consume up to 20 watts in On Mode to qualify as ENERGY STAR; for monitors with 1 million pixels or more, On Mode levels are calculated by using the formula Y = -5 + 26X (e.g., a 1 million pixel monitor would be allowed 21 watts, as -5 + 26(1) = 21). This On Mode specification recognizes the top 22% of energy performers in EPA's current data set. Similar to past specifications, EPA has provided Tier 2 to serve as an "energy-efficiency roadmap" for manufacturers.

B. Sleep and Off Modes

Tier 1 Sleep and Off Mode levels (4 and 2 watts, respectively) have not changed and remain consistent with Draft 1.

Tier 2 Sleep and Off Mode levels (2 watts and 1 watt, respectively) have been added to this latest Draft. Based on the current data set, approximately two-thirds (63%) of the monitor models consume 2 watts or less in Sleep Mode. Similarly, more than half (57%) of the monitors recently tested and submitted to EPA meet the proposed 1-watt Off Mode requirement. Further, the 1-watt level is designed to coordinate with FEMP's standby recommendations for monitors. Please note that while the potential qualification levels for Sleep and Off Mode levels appear to be well over 25%, a monitor model may only bear the ENERGY STAR if it meets the performance criteria for all three operational modes. Based on its research and analysis, EPA believes that the On Mode specification will be more challenging for manufacturers and will lower overall qualification rates.

Any references to Sleep Mode Default Time have been removed from Draft 2. As currently defined in the Version 3.0 Computer Agreement, the computer shall activate the monitor's Sleep Mode within 30 minutes of user inactivity. Since this new Monitor Specification (Version 4.0) does not specify a Deep Sleep Mode, the 60-minute default time will no longer apply when this Monitor Specification takes effect. Finally, in future specification discussions for computers, EPA is contemplating a proposal for a 15-minute or less default time for monitors.

Brightness (Luminance), Contrast Ratio, Defective Pixels, and Warranty

Based on industry feedback on Draft 1, EPA has deleted sections on Contrast Ratio, Defective Pixels, and Warranty and integrated requirements for Brightness (Luminance) into the Test Methodology. EPA's rationale for making these changes was presented in the document entitled "ENERGY STAR Computer Monitor Test Methodology: Development Summary (dated February 2003)," which was forwarded in February via email to all stakeholders and is now available at www.energystar.gov/productdevelopment.

## 4) Test Methodology

Over the course of several months, EPA developed an integrated computer monitor test methodology to measure power consumption in On, Sleep, and Off Modes. Following the industry meeting in April 2002, EPA provided interested stakeholders with several opportunities to comment on the test methodology. Draft 2 of the Computer Monitor Specification incorporates the latest test methodology, which is largely consistent with the version circulated in late February 2003.

The following are a few noteworthy changes to the test methodology since February 2003.

- Based on a voltage variability analysis of data received to date showing sufficient data consistency, EPA has reduced the sample size from 15 data points per model (five serial numbers tested per model, at each of three different voltage/frequency combinations) to three data points per model (three serial numbers tested at a single voltage/frequency combination of 115 volts, 60 Hz). Of note, EPA is continuing to evaluate whether any additional adjustments are needed to the test sample.
- EPA has added a statement regarding stable power measurements in Off Mode/Standby Power for models with DVI inputs. The statement allows manufacturers to ignore the DVI input check cycle when metering models in Off Mode.
- VESA contact information has been inserted to facilitate requests for high-resolution test patterns, which currently aren't available for download on the VESA Web site due to their size.

Finally, Draft 1 included two testing sections, one addressing power measurement and the other providing test criteria. For simplicity, content from these two sections has been combined and is presented under one section, 4) Test Methodology, in Draft 2.

## 6) Effective Date

Due to the significant amount of time required to prepare a comprehensive and repeatable test methodology, the effective date proposed in Draft 1 is no longer valid. Further, for Draft 2, EPA has proposed two dates, consistent with its tiered specification approach.

### A. Qualifying Products Under Tier 1 of the Version 4.0 Specification

EPA has provided a new Tier 1 effective date of **November 1, 2004** in Draft 2. All products, including models originally qualified under Version 3.0, with a **date of manufacture** on or after November 1, 2004, must meet the Tier 1 (Version 4.0) requirements in order to qualify for ENERGY STAR (including additional shipments of models originally qualified under Version 3.0).

Due to the elimination of grandfathering, EPA has delayed the introduction of the Version 4.0 specification by approximately one year, until November 1, 2004. This one-year lead-time is provided to allow manufacturers to make appropriate plans or other adjustments based on their products' design and manufacturing cycles.

B. Qualifying and Labeling Products Under Tier 2 of the Version 4.0 Specification

A Tier 2 effective date of **November 1, 2005** is provided in Draft 2. Consistent with Tier 1, a product model must meet the ENERGY STAR specification in effect on the units' date of manufacture in order to qualify as ENERGY STAR.

As discussed previously, Office Equipment Partners may begin to use the new ENERGY STAR label in 2005. Accordingly, EPA expects Monitor Partners to use the new label on models meeting Tier 2 of this specification in accordance with the ENERGY STAR Identity Guidelines and the Partnership Agreement. Labeling options will be presented and discussed at the July 22, 2003 Computer Monitor Partner Meeting.

C. Elimination of Grandfathering

This section has been added to stress that ENERGY STAR qualification is not automatically granted for the life of the product model. Models that qualified under the Version 3.0 specification must meet the new Version 4.0 specification to continue to bear the ENERGY STAR.

## 7) Future Specification Revisions

In Draft 2, EPA has noted its intent to review the Tier 2 specification approximately one year prior to its effective date. This review may or may not lead to substantive changes, and is conducted solely to ensure that future specifications are both in line with the ENERGY STAR guidelines and the current marketplace.